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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,516	01/20/2004	Christopher Richard Doerr	C. R. Doerr - 81	1467
7590	11/18/2004		EXAMINER	
John A. Caccuro 9 Ladwood Drive Holmdel, NJ 07733				PENG, CHARLIE YU
			ART UNIT	PAPER NUMBER
			2883	

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/760,516	DOERR, CHRISTOPHER RICHARD
	<b>Examiner</b>	<b>Art Unit</b>
	Charlie Peng	2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

### A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) Claim(s) 1-16 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-16 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a) All    b) Some \* c) None of:
      1. Certified copies of the priority documents have been received.
      2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
      3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/05/04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 1/20/2004 is in compliance with the provisions of 37 CFR § 1.97. Accordingly, the information disclosure statement has been considered by the examiner. See attached copy of IDS.

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR§1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP §609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. §102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Independent claims 1 and 13 and dependent claims 4, 7, 9, and 10 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 6,785,446 to

Chandrasekhar et al. Referring to claim 1, Chandrasekhar et al. teach a series of three Mach-Zehnder interferometers (**411, 412, 413** in **Fig. 4** or Column 5, lines 31-42). The first and third MZIs (**411, 413**) both include fixed 50/50 couplers (**402, 409**). The second MZI include a first adjustable coupler (**411** as adjusted by **403** via **Control 1A**) and a second adjustable coupler (**413** as adjusted by **406** via **Control 1A**).

4. Referring to claim 4, which is a dependent claim of claim 1, in addition to what is disclosed and used in this office action to reject claim 1, Chandrasekhar et al. teach that the **403** and **408** are variable phase elements able to shift the phase  $0\pm90$  degrees (Column 5, lines 35-38).

5. Referring to claim 7, which is a dependent claim of claim 1, Chandrasekhar et al. teach that an optical apparatus whose functions include dispersion equalization or compensation can be used in optical communication systems to mitigate various impairments. Chandrasekhar et al. further teach that the equalizer (or compensator) can be made in planar lightwave circuit (a lightwave circuit is inherently an optically integrated circuit) technology.

6. Referring to claim 9, which is a dependent claim of claim 1, the six components claimed by the applicant are the basic components inherent to any optical communication system. Chandrasekhar et al. teach that the dispersion equalizer (or compensator) to be used to be in filter narrowing, transmitter and receiver impairments mitigation (Column 1, lines 50-53); in an optically amplified system (Column 3, lines 2-17); and in an application for a multiwavelength transmission system comprising a multiplexer (**802**) and demultiplexer (**805**) (**Fig. 8A**).

7. Referring to claim 10, which is a dependent claim of claim 1, Chandrasekhar et al. teach that the dispersion equalizer (or compensator) can be implemented to compensate many wavelength channels simultaneously, and, in one embodiment, to include a MZI with a free-spectra range of 50 GHz – an integer multiple of the channel spacing (**Column 1, lines 34-45**).

8. Referring to independent claim 13, Chandrasekhar et al. teach a cascaded arrangement of two sets of MZIs, each having the same structure as described and rejected in applicant's claim 1. (**Fig. 4**)

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al. as applied to claim 1 above, and further in view of Okuno et al. Chandrasekhar et al. teach three cascaded MZIs. The first and third MZIs both include fixed 50/50 couplers. The second MZI includes a first adjustable coupler and a second adjustable coupler. Chandrasekhar et al. do not teach the adjustable couplers having path length difference of a half wavelength at a condition of zero electrical power. Okuno et al. teach an asymmetric MZI with a region (**Fig. 3A, between 33a and 33b**) having an optical path length difference of half a wavelength. In the state when the

heater/electrode (34a) is not activated, the wavelengths at which the waveguide dispersion cancel one another as the light passes through the interferometer, thus zero dispersion. It would have been obvious to a person with ordinary skill in the art at the time the invention was made to let two paths of the adjustable coupler have an optical path length difference of half wavelength in the zero power state. The motivation would be to prevent the crosstalk to the bar path from occurring in the OFF state.

10. Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al. as applied to claim 1. Chandrasekhar et al. teach using y-branch couplers (201, 105, Fig. 2A) for the fixed couplers in a different embodiment. Although Chandrasekhar et al. teach using two-way y-branch couplers in the embodiment used by the examiner to reject claim 1, both y-branch and two-way y-branch couplers are commonly used and known in the art. It would have been obvious for one with ordinary skill in the art at the time the invention was made to use y-branch couplers in the particular embodiment suggested by the application if the one only needs to split a single optical signal into two separate signals as opposed to crossing over two distinct light signals. The motivation would be to reduce the cost and/or size of an interferometer made using the y-branch couplers.

11. Independent claim 11 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al. in view of U.S. Patent 6,807,372 to Lee et al. Chandrasekhar et al. teach a first MZI including a 50/50 coupler, a second MZI with an adjustable coupler and a path length difference twice that of the first MZI. Chandrasekhar et al. do not teach a reflective facet placed at the mid-point of light paths

of the second MZI, so that all light signals are reflected back, the path length difference is same as the first MZI, and the remaining parts of the MZIs are not needed. Lee et al. teach an MZI where a reflecting mirror is placed at the mid-point (**Fig. 5b**), an arrangement that is essentially, with the addition of a circulator, a folded structure of an MZI in **Fig. 5a**. It would have been obvious to one with ordinary skill in the art at the time the invention was made to apply this technique in the present embodiment described by claim 11. The obvious motivation would be to reduce the area on an integrated circuit using the MZIs.

12. Claim 12 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al as applied to claim 11 above, and further in view of U.S. Patent 6,782,205 to Trisnadi et al. Chandrasekhar et al. teach the embodiment as described in claim 11, but not a quarter-wave plate or any potential functions related to the quarter-wave plate. Okuno et al. teach the using of a quarter wave plate (**215**) in a path of light to create a signal offset of  $\frac{1}{4}$  wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made to insert a quarter-wave plate in the second MZI. The motivation, which is commonly known in the art, would be to mitigate polarization dependent effects in the light path.

13. Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al as applied to claim 13 above, and further in view of Trisnadi et al. Chandrasekhar et al. teach the embodiment as described in claim 11, but not a half-wave plate or any potential functions related to the half-wave plate. Okuno et al. teach the using of a half wave plate (**216**) in a path of light to create a signal offset of  $\frac{1}{2}$

wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made to insert a quarter-wave plate in the second MZI. The motivation, which is commonly known in the art, would be to mitigate polarization dependent effects in the light path.

14. Independent claim 15 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al. in view of U.S. Patent 6,807,372 to Lee et al. Chandrasekhar et al. teach two sets of three cascaded MZIs. Chandrasekhar et al. do not teach a reflective facet placed between the two sets of MZIs, so that all light signals are reflected back and the second set of MZIs is not needed. Lee et al. teach an MZI structure where a reflecting mirror is placed at the mid-point (**Fig. 5b**), an arrangement that is essentially, with the addition of a circulator, a folded structure of an MZI in **Fig. 5a**.

**5a.** It would have been obvious to one with ordinary skill in the art at the time the invention was made to apply this technique in the present embodiment described by claim 15. The obvious motivation would be to reduce the area on an integrated circuit using the MZIs.

15. Claim 16 is rejected under 35 U.S.C. §103(a) as being unpatentable over Chandrasekhar et al and Lee et al. as applied to claim 15 above, and further in view of Trisnadi et al. Chandrasekhar et al. and Lee et al. teach the embodiment as described in claim 15, but not a quarter-wave plate or any potential functions related to the quarter-wave plate. Okuno et al. teach the using of a quarter wave plate (216) in a path of light to create a signal offset of  $\frac{1}{4}$  wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made to insert a quarter-wave plate

in the second MZI. The motivation, which is commonly known in the art, would be to mitigate polarization dependent effects in the light path.

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d§2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d§887, 225 USPQ§645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d§937, 214 USPQ§761 (CCPA 1982); *In re Vogel*, 422 F.2d§438, 164 USPQ§619 (CCPA 1970); and, *In re Thorington*, 418 F.2d§528, 163 USPQ§644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR§1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR§1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR§3.73(b).

16. Claims 1-4, 6, 7, 9, and 10 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 and 10 of copending Application No. 10/664,340. Although the conflicting claims are not identical, they are not patentably distinct from each other because all the claimed elements in the instant application is presently claimed in the copending application, hence the present claims are not patentably distinct from the copending application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. §101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. §186 (1894); *In re Ockert*, 245 F.2d§467, 114 USPQ§330 (CCPA 1957); and *In re Vogel*, 422 F.2d§438, 164 USPQ§619 (CCPA 1970).

A statutory type (35 U.S.C. §101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. §101.

17. Claim 11 is provisionally rejected under 35 U.S.C. §101 as claiming the same invention as that of claim 9 of copending Application No. 10/664,340. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- 1) U.S. Patent 6,658,174 to Doerr;
- 2) U.S.P.G. Pub. 2002/0071628 to Zang et al;
- 3) U.S.P.G. Pub. 2003/0016938 to Hatayama et al.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charlie Peng whose telephone number is (571) 272-2177. The examiner can normally be reached on 8:30 am - 5 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CYP



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